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The Ætiology of Rickets.

A REVIEW OF THE WORK DONE BY THE GLASGOW SCHOOL.

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The subject of rickets is so large and has such an enormous literature, which is growing daily, that it was somewhat difficult to know where to begin. I ultimately decided that our several interests would probably be best served by recording the story of the rickets problem as I have seen it unfolded in Glasgow. A very personal element will thus naturally be obtruded, from which I trust the subject-matter will gain in interest what it will lose in comprehensiveness.

There are at present two main schools of thought regarding the ætiology of rickets—one with its stronghold in Cambridge, teaching that the disease is dietetic in origin, and the other, to which I belong, believing that defective hygiene, using this term in its widest sense, is the most important known determining factor in the causation of rickets.

THE FACTORS OF CONFINEMENT AND LACK OF EXERCISE.

I commenced my experimental work on rickets in 1906. For many years previously fitful experimental work on the subject had been done in Germany. My interest had been aroused in the anæmias of infancy, especially that type going under the name of von Jaksch's anæmia. It was taught in those days that rickets was an important predisposing or ætiological factor in this syndrome (von Jaksch's anæmia), but my own researches were definitely opposed to any such idea. As rickets is so liable to be complicated by catarrhal conditions, which might of themselves influence the blood picture, I determined to attempt to follow the blood changes from the inception of the disease experimentally induced. I was familiar with the usual text-book story of Bland-Sutton's experiences in the London Zoological Gardens; in those days I was a believer, looking upon the ætiology of rickets as settled. All the teachers of pædiatrics whom I held in esteem said that it was a dietetic disease, due to a deficiency of fat with possibly an associated excessive amount of carbohydrate; they had apparently anticipated the epoch-making discoveries of the vitamin school. However, I wrote to Bland-Sutton and asked him what was the best diet with which to induce rickets in puppies, and I received the reply, "Rickets is easily produced in young animals if they never obtain milk, no matter what the diet." I accordingly commenced by feeding my experimental animals on bread and water, rice and water, and oatmeal and water. They, however, just as in the similar experiments carried out by Baxter about 1881,[1] did not develop rickets but marasmus, whereas the control animals fed on milk and oatmeal porridge all became rachitic. Of these controls, one animal, which was ultimately intended to be the pet of a friend and had been exercised in the open, presented the least severe manifestations of the disease. This naturally directed one's attention to lack of exercise. This animal was allowed, for a matter of a week, still more exercise, and all appearances of rickets practically vanished; on once more confining him with the others he again became affected. In order to further test this hypothesis two sets of experiments were carried out. The confined animals and the controls were of the one litter, and were fed on the same diet of whole milk and porridge with occasional boiled horse-flesh. They were all housed in the same room; some were confined in a cage, whereas the others were allowed their freedom and on occasions taken out for walks. The confined animals became markedly rachitic, while those allowed their freedom did not.

On the strength of these experiments, and also of clinical histories in cases of rickets, I formulated the hypothesis that rickets is due to confinement and lack of exercise. My results were published in 1908,[2] and I suggested that, through improved general hygiene, just as typhus had ceased to be a scourge, so might rickets disappear. At this time I was unaware of Hansemann's paper, published in 1906,[3] in which he states that the cause could be written down as domestication, using this term in its widest sense. Hansemann usually gets the credit of being the first to suggest domestication as the cause of rickets, but it would seem that he had been forestalled by a Frenchman, Ferdinand Lataste.[4] Lataste attempted to rear some rodents obtained in Algeria, but found that in captivity they all developed a disease of the bones which developed earlier the longer they had been in confinement, and which he ascribed to "domestikation." Hansemann came to his conclusion from a consideration of the disease as it occurs spontaneously in man and animals, and also as induced experimentally. Rickets was at that time supposed to be unknown in Japan; Hansemann therefore induced one of his former Japanese students to capture a young wild monkey and to confine it in a cage. After curvature of the bones had developed the animal was sent to Hansemann in Berlin; histo-

logical examination of the bones revealed, in Hansemann's opinion, a picture identical with that seen in human rickets. The first known example of rickets occurred in an ape which had been confined in a Theban temple some 2,000 years B.C.[5]

Spontaneous Rickets in Puppies, Apparently due to Lack of Exercise.

Shortly after the completion of my experimental work I became acquainted with the occurrence of spontaneous rickets in animals kept by friends, and these may at this juncture be opportunely referred to. The one instance came under the notice of a farmer on the West Coast of Ireland, and I cannot do better than quote his own words from a letter which he sent me.

"I have learned of a case of rickets in a pup about which I am sure you would like to hear. This pup was fed on a perfect food, new milk, but from the very start was confined in the bottom of a barrel, where it was quite impossible it could exercise itself. One swallow does not, of course, make a summer, and one case of the kind does not prove that rickets is caused by want of exercise, but in the light of your investigation, and the great rarity of this disease in the West of Ireland (I never having seen a case of rickets in the West of Ireland in man or beast) it has weight."

The other example was recorded by Dr. John Fergus, of Glasgow, in the course of the discussion following the reading of my original paper to the Medico-Chirurgical Society of Glasgow. He told how during the previous summer his son and niece each had a fox terrier pup of the same breed and of about the same age. His son was able to run about with his pup, and thus it obtained plenty of exercise, but his niece, who was unable to do this, had her favourite tethered to a garden seat in order that she might always have it by her. Both animals were fed exactly alike so far as could be ascertained, and the only difference in their treatment seemed to be in the amount of exercise allowed. By the end of the summer the boy's dog was a fine healthy animal, whereas the girl's dog had become so deformed, from what Dr. Fergus described as rachitic curvatures of the bones, that it had to be destroyed.

Dietetic and Housing Conditions of Rachitic and Non-Rachitic Infants.

These various facts tended to confirm me in the opinion that rickets was not of dietetic origin, but consequent on confinement. To give numerical precision to my statements I extended my clinical inquiries and collected statistical information regarding the dietetic and housing conditions of rachitic children. During a period of two to three years I collected at my out-patient clinic facts in 500 cases of rickets regarding the length of time the child was at the breast, the age at which extra feeding was commenced, the size of the house and number of inmates per room, and the amount of time the child spent in the open air. Excepting that an attempt was made to deal with the disease in the active stage, and consequently only the youngest children were chosen, the cases were not specially selected; each day a certain number of those with apparently active rickets first presenting themselves for treatment were set apart for investigation. In this way I believed that I was obtaining a fairly representative sample of the material. For comparison[6] of some of the points I obtained histories of some 500 healthy non-rachitic children. I found no real difference between the length of time that the rachitic and non-rachitic children were breast-fed. In the vast majority of the rachitic children there was no evidence of a gastro-intestinal disturbance prior to the onset of the malady. There did emerge, however, the fact that the number of cases increased with the diminution of air-space allowed per person; some 10 cases only were observed when there were three occupants of a two-apartment house, whereas when four or more persons occupied one room the number of cases totalled 260. It was also found that though 135 of the children were said to have been taken out regularly, the mothers admitted in 340 instances that the children had not been taken out at all, or at least only very occasionally. Though I concluded that these findings gave considerable support to the confinement and lack of exercise theory, and that these probably reacted through deficient aeration or oxygenation, I must admit that the results might equally well support an infectious origin. In this connection cerebro-spinal fever is at once recalled to mind; this disease is now known to remain in abeyance till the supervention of a certain degree of overcrowding. Development of rachitic osseous changes while a child is resident in the well-ventilated ward of a hospital, a fact which I have observed, is, however, opposed to this analogy—though, it must be admitted, such an occurrence might be explained by a very prolonged incubation period.

Rickets and the Thymus.

At about that time the researches of Klose and Vogt and of Matti were receiving considerable attention. At the annual meeting of the British Medical Association at Aberdeen in 1914, Sir A. E. Garrod accepted it as an established fact that rickets was due to hypothymusism. We were fortunate in having associated with us at the physiological department of Glasgow University Dr. Mill Renton, who had done some previous work on the effect of thymusectomy in the guinea-pig; he, along with Dr. Madge Robertson, repeated the work of Klose and Vogt, but were unable to corroborate their findings.

In the paper[7] embodying their results the following were among the conclusions come to by Renton and Robertson: (1) Removal of the thymus does not make the animals more susceptible to spontaneous rickets; (2) removal of the thymus cannot be held responsible for the onset of rickets or similar bony changes, and the evidence we have obtained points to the changes which have been credited to the loss of the thymus really being due to the development of spontaneous rickets in young animals.

These conclusions were firmly supported by the later work of Park and McClure.[8]

Team Work: A Digression.

During the progress of the previously mentioned statistical inquiry published in 1915, Prof. Noël Paton and I had become collaborators. Much of my experimental work on rickets had been done in his laboratory, and we were engaged at the time on a clinical and experimental study of tetania parathyreopriva.[9] This co-partnership, which I particularly prize, has continued till the present time.

In this way the more or less academic aspect of disease has been brought into intimate association with the clinical, and vice versa, to the great benefit of both sets of workers, and—although I do not for one moment wish to magnify the importance of our researches, and appreciate as much as anyone their limitations—to the greater benefit of medical research than would have occurred had the two types of workers remained independent. A young physician or a young surgeon during his waiting period not uncommonly spends some time in a laboratory, but it is exceptional for the head of a physiological department and the head of a clinical department to become allied for serious and consecutive research. In my opinion the ideal would be to extend such a combine to include the chiefs of a pathological department and of a surgical department, so that as comprehensive an idea of vital phenomena as possible would be obtained. The usual conception of a medical unit and its potentialities does not stand comparison with such a league as above outlined. I do not, of course, suggest for one moment that such a combination is bound to result in epoch-making discoveries; the latter are only made by the man of vision—often alone and unaided, with the simplest and apparently unsuitable facilities—but I sincerely believe that were such alliances more general much discordant opinion on facts of everyday occurrence would disappear. Each member of the combine would benefit, and his department, as a result of the stimulation, be more productive. Personally, I have no hesitation in saying that much of the work emanating from my own department would not have been possible without such an alliance. It is also a privilege to be able to express our indebtedness to the Medical Research Council for the essential financial help in our various undertakings.

Social and Economic Factors.

But to revert to rickets, Prof. Paton and I determined to extend the statistical inquiry into the social and economic factors in the lives of rachitic children. As I have previously mentioned, my own statistical study fell short in many respects, the chief being that in the case of some of the factors studied non-rachitic and rachitic children were not compared, and also that the diet of the children after the cessation of breast-feeding had not been investigated. Prof. Paton had already supervised a dietary study of the labouring classes in Edinburgh[10] and of the working classes in Glasgow,[11] and the intention was to repeat such a comprehensive dietary inquiry in known rachitic and non-rachitic families of the same social scale, and at the same time to pay attention to the housing conditions. We were happy in obtaining the services of Miss Margaret Ferguson, who had had some previous experience in social work at Queen Margaret's Settlement of Glasgow University. The study extended over a period of two years and embraced 350 rachitic and 200 non-rachitic families. The length of time the child was breast-fed, the position of the child in the family, the condition of the bowels previous to the onset of the disease, the amount of air-space in the house allowed per man, the number of stairs up that the house was situated, and whether or not the child had been much out of doors—all points previously investigated by myself—were again inquired into. The following considerations were added: (1) Parentage; (2) previous health; (3) (*a*) the diet of the child previous to the onset of rickets, and (*b*) the diet of the families; (4) size of family and condition of the other children; (5) family income; and (6) general character of the housing. The names and addresses of the rachitic and non-rachitic families were obtained from the outdoor department of the Royal Hospital for Sick Children, Glasgow. The houses were visited by Miss Ferguson, who recorded all the details, weighed the food daily for one week in each of the dietary studies, took a sample for examination, and collected all waste for the correct estimation of the amount eaten. The results of this investigation were published in detail as a special M.R.C. report with a historical introduction by myself, and a concluding critical analysis of the results by Prof. Paton and myself.

Environmental Advantages of the Non-Rachitic.

From this study it was concluded that in environment, as evidenced by conditions of housing and parental care, there was the greatest difference between the rachitic and the non-rachitic families. The average air space per person was, in the case of marked active rickets, 396 cub. ft., in the case of slight rickets, 452 cub. ft., and in that of the non-rachitic child, 565 cub. ft. So far as maternal care was concerned this could be described as good in only 46 per cent. of the rachitic but in 84·5 per cent. of the non-rachitic households. In this connection it must be admitted that the rachitic families were 20 per cent. larger than the non-rachitic families, and the health of the mother was bad in nearly 30 per cent. of the rachitic (but in only 5 per cent. of the non-rachitic families), two factors which, while reacting on the amount of parental care, might probably at the same time mean less available food per individual. But diet did not seem to play any important part in the question. The average caloric intake per man was, in the rachitic families, 3315, with a minimum of 2223 and a maximum of 4702, and in the non-rachitic families 3390, with a minimum of 2311 and a maximum of 4588. In the case of the rachitic families 26 per cent. consumed less than 3000 calories per man per day, as

against 25 per cent. in the case of the non-rachitic, while 33 per cent. of the rachitic and 45 per cent. of the non-rachitic families consumed more than 3500 calories per man per day.

So far as the individual proximate principals of the diet were concerned, 52 per cent. of the rachitic and 60 per cent. of the non-rachitic families consumed more than 100 g. of protein per man per day, and 48 per cent. of the rachitic and 40 per cent. of the non-rachitic less than 100 g. per day, but in no instance, in either the rachitic or the non-rachitic families, was less than 80 g. per man per day taken. The average daily consumption of fat per man for the rachitic families was 87·3 g., with a minimum of 50·9 and a maximum of 124·5, and for the non-rachitic families 96·7 g., with a minimum of 52·4 and a maximum of 131·3 g. No correspondence between the amount of fat consumed and the severity of the rachitic manifestations was observed; 14 per cent. of the rachitic and 20 per cent. of the non-rachitic families consumed less than 70 g. of fat per man per day.

Nor did the family income seem to bear any relationship to the disease. 51·6 per cent. of the markedly rachitic and 37·5 of the non-rachitic families had a weekly income of 20*s.* to 30*s.*; 25·2 per cent. of the markedly rachitic and 31·5 per cent. of the non-rachitic families had a weekly income of between 30*s.* and 40*s.*; 14·8 per cent. of the rachitic and 26·5 per cent. of the non-rachitic families had weekly incomes of over 40*s.* Perhaps the best idea of the influence of the income is obtained from the amount expended per man per day on food and rent. The average daily cost of food per man in the rachitic families was 9¼d. and in the non-rachitic 10¾*d.*, while on rent the former spent 6½*d.* and the latter 7½*d.*

The Vitamin Deficiency Theory.

During the course of this research Mellanby[12] commenced his work and resuscitated the earlier teaching that rickets was due to deficiency of fat in the diet—except that in his opinion it was not from the absence of the fat *qua* fat, but because there was, linked to it, an antirachitic vitamin, identical with or similarly distributed to fat-soluble A. Mellanby[13] stated that he could induce rickets in pups by feeding a diet of bread and milk (175 c.cm.), and that the disease could be prevented by the administration of butter, cod-liver oil, and most other fats tested. His preliminary notes, and the knowledge that at Cambridge work was proceeding which, it was said, contradicted the conclusions come to by the Glasgow school made us doubly critical of our findings.

We found it impossible to modify our conclusions; but to make assurance doubly sure we reverted to the problem once more. Of two litters of pups being used in a metabolic study, five were sent to the country and fed on a diet of porridge and skim milk, the daily intake of fat being certainly not more than 2·8 g.; these animals were properly exercised. The remaining pups of either litter were kept at home in the laboratory, fed on porridge and whole milk with, in some cases, the addition of butter, so that the daily intake commencing at 3 g. rose to 6 g., and with the addition of butter amounted to even 14·5 g. Of those in the laboratory, some were allowed to run about, and others were kept confined in cages. All the laboratory pups, on being killed at the age of 11 weeks, showed signs of rickets—one receiving butter being the most severely affected—whereas those brought up in the country remained absolutely normal.[14]

A still further set of experiments carried out by Paton and Watson[15] gave practically the same results. Of one litter two animals received 7·5 g. and 11·0 g. milk fat per day; a third, fed on separated milk, had only 0·8 g., and presented a most severe degree of rickets. Of the other litter three animals obtained 7·5, 3·0, and 0·8 g. of butter fat per day. On the whole, rachitic manifestations were severest in the animals fed on the separated milk. The only animal of the series which did not present rickets had, however, been fed on separated milk; another, with marked rickets at the age of 14 weeks, was given extra fat, so that it received 10 g. per day, yet when killed at the age of 19 weeks it showed an apparently extended rachitic condition. These experiments seemed unmistakably to justify the conclusion that whatever the cause of rickets, deficiency of fat intake could not be blamed. In many of Mellanby's experiments animals of different litters had been employed and compared with one another, a most dangerous procedure to follow in view of the notorious varying susceptibility of different breeds of dogs to the disease. Mellanby,[16] in justifying such experimental conditions, waives this objection aside on the ground that it can only have a bearing on the hereditary aspect of the disease, a matter not of prime importance. I would here like to emphasise the fact that in all the experimental work done in Glasgow only animals from the same litter have been compared in any one test.

A critical survey of the dietaries in the last recorded set of experiments suggested that animals with the lowest caloric intake presented the most severe grade of the mischief, and further experiments were set going to test this deduction. Pups from three different litters were fed on different diets, diets of full cream, fresh milk, full cream dried milk, separated milk and separated dried milk plus lard—the caloric intake being made more or less alike by the addition of bread, and during the experiment kept constant per kilo body-weight by increasing the amount of bread as the animals grew. In this series of experiments the only animals which developed slight rickets had been fed on a diet of separated milk and bread, findings which seemed to support to some extent the vitamin theory; but certain considerations raised more in our minds the old and oft-quoted question of the possibility of an infection.

The Theory of Rickets as an Infection.

The difficulty of keeping the animals clean had always been noticed during our experimental work; in this experiment the full time of a laboratory boy was engaged for the feeding and care of the animals.

The position of the pens enclosing the different sets of animals was changed from day to day, and to these precautions we were inclined to ascribe the mildness of the rachitic process. In his record of these results Prof. Paton drew attention to an epidemic of rickets in a kennel of fox-hounds in Adelaide which had just been reported by Bull, where removal of some of the pups to fresh ground prevented the onset of the disease.

The idea of rickets being of the nature of an infection had always been before us. I was aware of the older work of Moussu[17] and of Torane and Forte[18] and of the more recent work of Koch,[19] who said that he could induce rickets experimentally by the injection of cultures of streptococci. In my original paper I dismissed the idea of rickets as an infection, and I personally have continued to do so, for the simple reason that we have not the slightest amount of positive evidence in its favour. Apart from the work above-mentioned, comparatively little has been done to test it; at present, the more theories we have the better, so long as we appreciate that a theory is a confession of ignorance, and that its only justification is to act as a finger-post for lines of research. If rickets be of the nature of an infection, then it behaves very differently from any infection that we are acquainted with. It is often compared to tuberculosis, which it is now the fashion to speak of as a dietetic disease. Tuberculosis and rickets are said to affect the poor and badly housed; but be it remembered that while tubercle is rife among native races living under their natural conditions, rickets only attacks them when they house themselves as so-called civilised men.

Nevertheless to test the infective theory of rickets we in Glasgow have carried out various sets of experiments. Prof. C. H. Browning and Dr. Haswell Wilson have attempted to obtain evidence of a specific antibody in rickets by means of the complement-deviation test. As antigen, watery and alcoholic extracts of rachitic cartilage from the ends of the long bones and ribs were employed. In no case, however, was the reaction positive, and while not necessarily negativing an infective origin, their researches (no account of which has been published) lend absolutely no support to the idea. The infectious nature of the disease was further tested by injecting puppies with blood recently drawn by venepuncture from children suffering from active rickets. Not only were there no positive results of this procedure, but such fine animals as those puppies were never reared in the laboratory. The work of McCarrison on goitre, and the earlier work of Monpurgo, induced us to try experiments by feeding pups with the fæces from cases of rickets. These experiments are still in progress.

The similarity of the conditions under which typhus and rickets prevail, and the knowledge that the infection of typhus is spread by body lice, suggested to our minds the possibility of rickets being similarly transmitted. I therefore commenced to note the frequency and extent of flea-bites in rachitic and non-rachitic children, and soon found that without exception rachitic children were flea-bitten, and often badly, but the non-rachitic practically not bitten at all. This, however, I was inclined to consider as merely further evidence of poor parental care and of bad hygienic conditions, since, as noted above, rickets had been observed to develop in a hospital where this factor could be eliminated.

Present Position of Inquiry at Glasgow.

As time has progressed we in Glasgow have become more and more engrossed in the rickets problem, and have been successful in stimulating many workers to tackle the question from different points of view. Experiments on the ætiology (clinical and experimental), social and economic studies, metabolic experiments, and therapeutic tests have been going on side by side, and are still proceeding, and it is thus impossible to continue the story in strict chronological order, but there remains nevertheless still much of our work to detail.

It is always possible to criticise such investigations as the previously recorded dietary studies, because one can never be certain that the child has ingested a definite amount of fat, it simply being assumed that it gets its proper proportion of the available calories. I think it is also justifiable to criticise the animal experiments, even when the diet is definitely controlled, on the grounds that the disease in man and the animal is not necessarily the same. In consequence, for conclusive evidence regarding the relative importance of the various factors one must come back to exact information obtained in the child.

The first definite experiments of this kind were made by Hess[20] of New York, who fed a series of children on a diet poor in animal fat, any fat that was present being in the form of cotton-seed oil (poor in the so-called antirachitic factor according to the vitamin school), and yet he saw no greater tendency for these children to develop rickets than those normally fed. Pirquet, of Vienna, does not consider fat an essential element of the diet of a child, and feeds many of his children on what must seem deficient fat mixtures. This, along with the supposed increased prevalence of the disease in Vienna, suggested to the vitamin school that Vienna should form a valuable centre for the study of this aspect of the problem, and the Lister Institute accordingly sent out a number of workers. We, like Pirquet, have no fear of feeding infants on a fat-poor diet, in fact, clinical experience leads us to the conclusion that such a diet is essential in many cases for the child's well-being. I may, perhaps, be permitted to recall to your minds in this connection the favour with which buttermilk has been employed as an infant food in the north of France and Belgium.

Experiments at Glasgow with Fat-Poor Diet.

For some time past Dr. J. D. Galbraith and I have been collecting information on this point. We prescribe the diets and see the cases every week, and we have no cause for doubt that the children receive the diet prescribed. In not a few cases the children have been resident in hospital, and under these

circumstances there can be no suspicion entertained regarding this point. Notes regarding the general development of the child are made periodically, but special attention is paid to teething, age of commencing to walk, and the condition of the bones as evidenced by X-ray examination. I do not intend at present to detail these researches; the work is still in progress, and Dr. Galbraith hopes to publish the results in full at an early date, but I may say that nothing has emerged to shake our confidence in our previous conclusions. Many of the children on a fat-poor diet present no evidence of the disease, and some of the most severe examples of mischief have occurred in cases fed on a fat-rich diet, and, as I have previously recorded, cases are not unknown in whom cod-liver oil, to the amount of ʒii. daily, had been given for as long a period as one year, and yet marked rickets developed.

Experiments in India.

I would like at this point to refer to certain observations, which, though not carried out in Glasgow, were made by one who had received his introduction to the subject in our departments, and who is now once more an active member of our unit. I refer to the recently published work of Dr. Harry S. Hutchison on "Rickets in India."[21] The idea of fat deficiency being the cause of rickets—although hinted at by Baxter[1] in a discussion before the London Pathological Society in 1881—did not become crystallised till the time of Bland-Sutton's observations about 1883-84. Thereafter the fat deficiency theory rapidly gained ground. In 1888 Cheadle, during a discussion on rickets at the annual meeting of the British Medical Association in Glasgow, categorically stated that "rickets is a dietetic disease" and that "the chief defect in the diet is a want of animal fat."

Stimulated by this teaching, and by the knowledge that the diet of the Indian native was poor in fat, Dr. William Huntly,[22] a Glasgow graduate and a medical missionary, thought that India should therefore be a favourable breeding ground for the disease, and commenced a survey of Rajputana, the district in which he was situated. He found, as had generally been stated, that the diet of the poor Indian was very deficient in fat, but yet rickets seemed to be practically an unknown disease. The only example which he himself observed occurred in the anæmic and wasted child of a Parsee. Huntly therefore concluded that deficient fat in the diet could not be the cause; in view of the different amount of sunshine in Glasgow and India, he suggested lack of sunshine as the ætiological factor. Unfortunately, however, Huntly apparently had only opportunities of observing the poor Indian, an omission which Hutchison has rectified. Hutchison was fortunate in being enabled to make an extensive survey of the dietetic and housing conditions of the rich and poor of all religious beliefs in Nasik, and he has obtained results which support in a most surprising manner the conclusions of the Glasgow School. The conditions of the people could not have been better arranged in a laboratory. The housing and dietetic conditions were most sharply contrasted. In consequence of the purdah system practised by the wealthy Hindus and Mahommedans, the children of the rich were much confined in airless and sunless rooms, not only during infancy, but also in the case of the girls about puberty, when they went to reside in their future husband's house. The poor, on the other hand, lived in tents or huts and led an open-air life. The various articles entering into the diets of the two classes were the same, though they were quantitatively differently distributed. There was, however, practically no difference between the energy values of the diets of the two classes, but in the poor much less of this was represented by fat than in the case of the rich, and further, what is most important, in the diet of the rich this element was present chiefly as animal fat, in the form of milk and ghee, whereas in the case of the poor animal fat was often absent from the diet altogether, and if present only in very small amounts.

Hutchison found early rickets during infancy and late rickets in the young girl-wives prevalent among the rich and very scarce among the poor. That he was indeed dealing with early and late rickets is manifest from the numerous X-ray photographs which he brought home and from the examples published in his paper in the *Quarterly Journal of Medicine*. His findings warranted no other conclusion than that, as Huntly had previously stated, the absence of fat from the diet played no part in the cause of the disease, but that rickets ensued on confinement. It is interesting to record that Hutchison noted great improvement, in fact rapid recovery, in many cases by simply putting the patients in the sun and fresh air. No change in the diet was made, the meals being cooked as usual in the patient's own home and brought to the hospital. No drug treatment was employed. These therapeutic results suggest Huntly's explanation of want of sunlight as the probable ætiological factor, but against this assumption I might point out that we get better and more speedy results by employing massage and electricity and leaving the child in its own home in the city than by sending the child to the country branch of our hospital, where there is without doubt a greater abundance of sunshine.

Therapeutic experiments have been going on in Glasgow for some considerable time. The results of some of these were recorded early last year.[23] Working on the hypothesis that confinement acted by limiting muscular movement, treatment by massage and electricity was instituted, a method which has up till the present given us the best results—at least in this way, we have been able to get the child up and walking in the shortest space of time. Unfortunately, we did not in our earlier cases follow the X-ray changes at the ends of the long bones, but to this Dr. Galbraith has latterly paid attention, and we have been astonished to find that although the child may be walking in a matter of four weeks, little or no change may be observed in the state of ossification until two or three months later. We have not, however,

observed healing to occur any more speedily by the administration of cod-liver oil and phosphorus. Park and Howland,[24] on the other hand, state that improvement is noticed in almost all cases by the end of a month after commencement of the treatment and that the bones are practically normal in two to three months. We are inclined to estimate the duration of healing at five to six months; the most rapid bone changes we have observed were consequent on exposure to the ultra-violet rays. Curiously, however, though the administration of cod-liver oil produced very definite evidence of healing as seen by X-ray examination, clinical improvement—*i.e.*, ability to walk—is totally absent. This suggests a much greater participation of the muscular system than is generally supposed, though it has always been known that muscular weakness may be so severe as to suggest to the attending physician paralysis. I might here refer to the work of Miss Henderson,[25] of Glasgow, on the creatin content of muscle in rickets. Cathcart, Henderson, and Paton[26] have shown that no change in creatin content of muscle results early from section of the nerve. Miss Henderson found in experimental rickets a diminution of creatin content to the extent of 35 per cent. Bing, it may be recalled, has described degenerative changes in the muscle of rachitic children, and these have lately been corroborated by Banu[27] and Bourguignon.[28]

Metabolism Studies.

Though we have devoted considerable time to the study of the metabolism in rickets, it must be perfectly understood that this line of research has very definite limitations. From metabolism studies we may the better understand the cause of certain symptoms and the manner in which some of the changes are produced, but we will not necessarily learn anything concerning the real cause of the disease. Metabolism experiments in pneumonia and tuberculosis, for example, would not give us the least inkling of the causes of these maladies. I know, of course, that some will say I am taking a narrow view of the position, and will argue that tuberculosis is as much a dietetic disease as a bacillary one. Defective nutrition may make an individual more susceptible to tuberculosis infection, but no matter how badly nourished he be, tuberculosis will not arise without the tubercle bacillus. To accept any other doctrine would be to put back the hand of time by ages.

The Problem of Absorption of Fat.

We have, as you can gather from what I have already said, become more and more convinced that deficiency of fat, at least so far as intake is concerned, is not the cause of the disease. There was, however, just the possibility, though the experiments with fat-poor diets were distinctly against any such hypothesis, that while a sufficiency of fat is ingested this element is very imperfectly absorbed. Hutchison,[29] who had previously worked with us on the absorption of fat in marasmus, investigated this point and found that fat digestion and absorption were as good in rickets as in health.

Rickets and Calcium Metabolism.

Since deficiency of calcium in the bone is such a characteristic feature of the rachitic process it was thought that by studying the metabolism of this element some insight into the pathogenesis of the disease might be obtained.[30] It will be admitted that this deficiency must arise in one of three ways: (1) A deficient supply of calcium to the bones, due to (*a*) a deficient supply of calcium in the food, or (*b*) a deficient absorption of calcium from food; (2) the inability of the growing bones to fix the calcium brought to it by the blood; or (3) a non-retention of calcium by the rachitic bone—*i.e.*, decalcification.

Deficient calcium supplied in the food as the ætiological factor was for many years a favourite theory, and found its expression in the popular view in my own town, where the disease use to be ascribed to the well-known lack of calcium in our water-supply. During last century, commencing about 1866, many workers attempted to induce rickets experimentally by depriving animals of calcium. Undoubtedly, in consequence of such a regime osseous changes result, a fact not to be wondered at when we consider the extent to which this element enters into the formation of bone. In fact, the wonder would be if no change did result. The same is even more true when both calcium and phosphorus, as some of the present-day workers are doing, are removed from the diet. Such experiments will never help us to understand how the perversion of these elements arises, for one thing is certain—rickets does arise when these elements are being presented and ingested in ample quantity. The earlier workers—*e.g.*, Roloff and Voit—looked upon the changes induced in this way as true rickets, but later observers—*e.g.*, Stoeltzner and Dibbelt, working at a time when the histology of the disease was better appreciated, did not consider the condition true rickets but merely osteoporosis. The tissues generally of animals deprived of calcium are poor in this element, whereas, as we and others have shown, in rickets the tissues other than the bones do not show any deprivation of calcium. Moreover, the fact that most experimenters, and we among them, have been able to induce rickets when a normal amount of calcium is supplied, and the fact that many children develop the disease on a diet of cow's milk, which contains at least four times as much calcium as does human milk, is surely against the idea that the disease results from calcium starvation. If osteoporosis and not rickets results from the deprivation of calcium, then as a corollary the disease cannot be due to deficient absorption from the gut. Nevertheless this opinion, based on metabolism experiments in children, has often been expressed.

The chief difficulty in the evaluation of such experiments is to decide how much calcium has never been absorbed and has simply passed through the gut, and how much has been absorbed and re-excreted. These two conditions postulate different changes in metabolism. I think it is doubtful if calcium is excreted by the gut, in spite of the experiments of Grosser and Berg, which seem to support such a hypothesis. Telfer, working with us, has found that by cutting

down the calcium in the diet to negligible quantities the calcium practically disappears from the fæces. Telfer's observations were made on healthy infants, and, of course, it must be admitted that the same might not occur in the presence of rickets. Ragner Berg's work was done on himself while apparently in good health, but that of Grosser, on the other hand, was carried out in both rachitic and normal children.

Experiments.

In any case much of the previous metabolism work on calcium has been done in experiments extending over only a very few days (1-3), and, as we early discovered that the calcium content of the fæces is almost constant, the output of calcium entirely depends on the amount of fæcal matter expelled, a variable factor from day to day. No reliable deductions can, therefore, be drawn from short period experiments. We thus decided to renew the work but lengthening the periods of observation to seven days or more. At first sight this might seem a very difficult matter, but by means of a special metabolism bed it is possible to collect the urine and fæces separately over such a lengthy period, and though the children are stretched out in rather a crucifixion attitude, they are well behaved and give little trouble; in fact, they are usually the best behaved babies in the ward. We carried out observations in normal children and also those suffering from rickets (early and late), and, so far as we could judge, only during the active stage of the disease. For the analysis of the results, and to render these comparable with one another, and also with those of previous workers, we reduced the intake and output of calcium to terms per kilo body weight, as this seemed to us the only method allowing of comparison of children of different ages and sizes. It was a method, too, which swept away many inexplicable discrepancies between our various findings and those of other workers.

A consideration of our results and of the work of previous investigators did not seem to indicate the profound disturbance in the calcium metabolism which many had assumed to be characteristic of the disease. In no case coming under our own observation did we find a negative balance when the experiment was sufficiently prolonged to justify reliable deductions. We found that the utilisation of calcium, meaning thereby the difference between the intake in the food and the output of fæces, is proportionate to the intake, but that in rickets the parallelism is not so strict as in health. The retention in rickets is more erratic and occasionally falls below the normal, and this we are inclined to believe occurred during the active stage of the disease. In the older children, especially when the disease was of some duration, the retention of calcium was above the normal and probably indicated recovery. The utilisation of calcium, both in health and disease, was markedly influenced by age.

These results, however, brought us no nearer to the cause of the malady, nor did they lead us any nearer the truth regarding the behaviour of calcium. The fact that in osteomalacia and acidosis—two conditions accompanied by decalcification—the calcium is excreted chiefly by the urine, while in rickets, if excretion occurs, it is by the fæces, was rather against the idea of decalcification and increased excretion in rickets. It was thought, however, that estimation of the calcium content of the blood might shed some light, as in all probability if increased excretion occurred, the calcium content of the blood would be high, whereas if deficient absorption prevailed, the calcium content would be low. In our estimations we found the calcium content normal.

If the calcium is brought to the bone in sufficient amount, and all evidence is in favour of such an assumption, may not the disease be due, as suggested by previous writers, to the inability of the rachitic cartilage to fix the calcium? Or may it be, as was suggested by Paton, because of it not being supplied in the proper combination—*e.g.*, through the defect of some other element such as phosphorus? Wells has shown that cartilage introduced into the peritoneal cavity of the rabbit absorbs calcium in proportion as it is destined to become calcified or not, and it occurred to us to carry out experiments with normal and rachitic cartilage on these lines. As a result of these experiments, however, we found that rachitic cartilage absorbed rather more calcium than did normal cartilage—findings which rather supported Paton's previous contention. It is interesting to record that Kramer and Howland, though they can find no alteration in the calcium content of the blood, have been able to detect a very definite deficiency of inorganic phosphorus.

Obscurity of Causal Process.

From a consideration of all these experiments and clinical studies what conclusions can we come to? Certainly no other than that in some way confinement and defective hygiene are the most potent causes in the production of rickets, and that the disease is intimately associated with our housing conditions. That diet plays a subsidiary part, if any part at all, I have no doubt. I would like to emphasise very strongly that I deprecate the view that rickets may have many causes, an opinion which we hear frequently expressed to-day. This is an absolutely new departure in pathology. We know of no analogous condition, and therefore before we accept such a hypothesis very definite proof must be forthcoming. Moreover, such a theory simply confuses the issue, and will retard rather than stimulate research. The multiplicity of its symptomatology does not by any means support a varied cause. Everybody who knows anything about rickets appreciates that the bone changes, though the most definite, are not the sole manifestations of the disease, but that the whole economy may suffer in unison.

I admit that in assuming defective hygiene as the cause it is difficult to visualise the ***modus operandi*** of the exciting factor. It is quite different from the case of the toxin of a bacterium. Confinement and lack of exercise seemed more definite and more

limited factors, and might, as I have suggested, exert their harmful influence by inducing deficient oxygenation. It was the idea that confinement and defective exercise caused the disease that suggested the line of treatment—viz., massage and electricity, which has given, in our hands, the best clinical results. This line of treatment is specially interesting in view of the observation that "Scabies or itching occurring in the course of this disease (rickets) contributes much to its cure," made by Dr. John Mayo[31] in 1674.

Conclusion.

And finally, as a conclusion to these somewhat discursive remarks, I would like to ask once more the question, "Is the disease as experimentally induced in animals the same as that which occurs spontaneously in the child?" I certainly thought that this was so in the early days of my work. My own original material was examined by Schmorl, of Dresden, who was at the time probably the greatest authority on the histology of the disease, and he expressed the opinion that the bone changes were identical with those seen in human rickets. I recollect very well, however, a conversation which I had with him on the matter, in the course of which he said that many of the conditions called rickets by veterinarians were not really rickets; and as time has passed I have myself come to doubt very much the validity of much of the experimental work. Far be it from my intention to belittle animal experiments (much of my own work has been of this nature), but because such and such happens in a growing dog or rat it does not necessarily mean that the same will happen in a growing child. We cannot, and I question if any good would be gained if we could, feed children on calcium and phosphorus-free diets, but we can and do feed children on very fat poor diets. Hess, as previously mentioned, has fed children on diets devoid of all animal fat, the tabernacle of the anti-rachitic vitamin, and yet rickets has not ensued. This is conclusive for me that whatever the condition may be which experimentalists are bringing about by administration of a fat-poor and a calcium-poor diet, that condition is not identical with human rickets.

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The Ministry and Foot-and-Mouth Disease.

Foot-and-mouth disease at the present moment concerns a great number of agriculturists, and even the ordinary citizen in so far as milk and meat supply are concerned. During the first three weeks of the year 1,470 animals were destroyed as affected or for having been in contact with diseased animals.

Correspondents from time to time condemn official methods, and point out what they have seen done in other countries. There are two sides to every story, and there is little doubt that the veterinary department of the Ministry of Agriculture is extremely well informed upon every aspect of the disease, and also upon some which rarely appeal to the unfortunate farmers who lose animals from it. One has only to go over the statistics for the last forty years to be convinced that a great deal has been done; but the point is, can better be achieved by more up-to-date methods?

Perhaps the ordinary breeder and dealer are not quite so sympathetic towards the pedigree herd as one might like, so that the export question does not appeal directly to them; and it is from their ranks that one often hears about cures, and less stringent measures. The disease, they say, is not fatal. They are right, but that is only half the truth. In over 100,000 cases in this country years ago the mortality was over 8 per cent.; but there are other losses, viz.:—milk supply, diseases of the udder, great loss of flesh, and complications to the affected feet, especially in unhygienic cow-houses, muddy yards, and in transit. So serious are these that all those who remember the good old days have nothing to say in their favour.

The disease was first seriously attacked by methods for its control in 1879, and it was a few years before any effect was seen. In fact, in 1883, foot-and-mouth disease reached its maximum, and the following table shows the prevalence of the disease since that year:—

Year.	No. of Counties Affected.	No. of Outbreaks.	Animals attacked. Cattle.	Sheep.	Swine.	Others
1883	75	18,732	219,289	217,492	24,332	32
1884	55	949	12,186	14,174	1,860	1
1885	10	30	354	34	30	—
1886	1	1	10	—	—	—
1887 to 1891 free (5 years).						
1892	15	95	1,248	3,912	107	—
1893	2	2	30	—	—	—
1894	3	3	7	261	—	—
1895 to 1899 free (5 years).						
1900	9	21	214	50	2	—
1901	3	12	43	626	—	—
1902	1	1	2	118	—	—
1903 to 1907 free (5 years).						
1908	1	3	112	—	—	—
1909 free.						
1910	1	2	13	—	2	—
1911	5	19	102	312	73	—
1912	16	83	512	40	93	—
1913	2	2	73	—	—	—
1914	8	27	141	—	25	—
1915	3	56	557	5	140	—
1916	1	1	24	—	—	—
1917 free.						
1918	1	3	14	—	—	—
1919	12	75	1,548*	1,199*	708*	8*
1920 approximately 93, with a total of 11,373* animals.						

* Slaughtered as diseased or exposed to infection.

It will be seen from the above table that slaughtering out was a good servant in 1886. By its aid there have been long intervals of absolute freedom, and the disease has never really got hold of the country as in the early eighties so as to threaten the cattle industry. Administrative measures associated with control considerably disturb breeding, shows, sales and the commercial aspects of cattle breeding. Although it is a poor consolation, slaughtered incontact animals realise full dead value. Nearly all countries with up-to-date veterinary police regulations attack fresh invasions of serious contagious disease by slaughtering out.

In Great Britain alone there are approximately 7½ million cattle, 21½ million sheep, and 2 million swine. The losses from slaughtering out in 1919 were 1,548 cattle, 1,199 sheep, and 708 swine, and if these were stated as a percentage of the population of cattle, sheep, and swine, it would be found to be extremely small. So small, indeed, that it would look insignificant when compared with the great losses which occur in tuberculosis and abortion in cattle. In questions of figures of disease prevalence it is helpful to keep in mind the animal population.

The Ministry of Agriculture is sometimes severely criticised for its methods, but if it were possible to publish the full details of some outbreaks, some livestock owners at least would not shine. Delay, lack of supervision, and thinking "it cannot be it" for a couple of days often do a lot of harm, and innocent neighbours may be the sufferers. It is a serious thing to suspect foot-and-mouth disease; but if it is in existence, it is more serious not to suspect it.

A veterinary surgeon told the Lambeth magistrate that cart horses, if in good bodily condition, realised almost as much if sold for human consumption as if sold to farmers for work on the land.

Venerable the Archdeacon of Raphoe has appointed Mr. T. A. McClintock, M.R.C.V.S., J.P., to be his churchwarden for the parishes of Conwall Union, Co. Donegal.

The Veterinary Record.

13th May, 1922.

"NOTES AND NEWS."

There is evidence of an increasing desire upon the part of members of the profession for the provision of space in the *Veterinary Record* for items of personal interest which are such a prominent feature in many American journals. When first the paper became the property of the Association it was realised that it might be necessary to provide such facilities, and it was therefore decided to start a Notes and News column. Needless to say, the editorial committee will be glad to receive such items of professional news, which will be published in the appropriate space. It must be remembered, however, that the provision of such information rests entirely with the individual members. The suggestion that facilities should be given to overseas members who are on leave in this country to make their whereabouts known in order that meetings may be arranged with friends and colleagues who are also home on leave was likewise welcomed by the editorial committee. Should the volume of such news render it desirable, a separate heading will be provided; meanwhile the information will appear in the "Notes and News" columns.

The editors will be glad to receive the necessary information to render these columns of general interest to members.

THE PRACTITIONER'S HOLIDAY.

Under the heading of "The Practitioner's Holiday" there recently appeared in the editorial columns of the *Lancet* an analysis of the difficulties which so commonly confront a medical practitioner who needs a holiday, and a possible solution. The position of veterinary practitioners is much the same, and if some workable scheme could be evolved by which a larger number would be enabled to take their well-earned rest, it would be a benefit to the individuals and to their science. The truth of Osler's observation, quoted in the article, that there is danger in this treadmill life lest the practitioner lose more than health and time and rest, his intellectual independence, is unquestionable, and even if, as the writer

states, the life of the individual is not shortened by continuous work in itself, the mental fatigue which is inseparable from such work must at times deprive him of that sensitive perspicuity upon which so much depends. The practitioner owes it to himself and to his art that there should be a period of relaxation.

Is there any reason why a scheme somewhat similar to that suggested for the medical practitioner should not receive at least a trial? If one of the Divisions of our Association would initiate such a scheme for the benefit of members in its area, we are convinced that there would be no lack of support.

Abstracts and Reviews.

Type Cultures Catalogue.

This is the first catalogue of strains maintained in the Collection at the Lister Institute from which Biologists and Bacteriologists may obtain authentic strains of recognised bacteria and protozoa for use in scientific work. Similar collections have been commenced at the Pasteur Institute, and at Prague and New York, but in this country British workers have, up to now, been dependent in great part upon the courtesy of scientific colleagues. The present attempt to establish a central collection upon a proper footing is due to the generosity of the Governing Body of the Lister Institute, and is only for a short term of years. The question of the future location of the collection remains to be considered.

Particulars are given in the catalogue of the type, group or variety to which the strain belongs, the name of the person through whom the strain was received, source from which isolated, name of isolation, date of isolation, and other useful data. We are glad to notice that workers at the Royal Veterinary College, London, and officers of the R.A.V.C. are recorded as having isolated and supplied strains of such bacilli as *B. abortivo-equinus*, *B. abortus*, *B. anthracis*, *B. avisepticus*, *B. erysipelatis suis*, *B. mallei*, *B. necrophorus*, *Corynebacteria diphtheriæ*, and *pseudo-tuberculosis*, *sporothrix*, *streptothrix*, etc.

This catalogue will be a most valuable guide to workers in all spheres of microbiology, and as it is the Council's intention to maintain the fullest international reciprocity in developing the collection, it will in time become the standard on which all workers in this field will depend.

[Catalogue of the National Collection of Type Cultures maintained at the Lister Institute of Preventive Medicine. Published by the Medical Research Council (H.M. Stationery Office, Kingsway, W.C. 1/6.)]

Public Abattoirs and Private Slaughterhouses.

Private slaughterhouses are a relic of bye-gone ages. The present-day system prevailing throughout England and Wales, and perhaps to a less degree in Scotland, is most unsatisfactory. No standard or uniformity exists. To obtain efficiency inspections and seizures must necessarily be uniform, not only in the larger towns but in all districts, both urban and rural, where meat is prepared or offered for sale. The only real remedy for the unsatisfactory conditions obtaining to-day is the establishment of municipally controlled slaughterhouses, and the abolition of private slaughterhouses.

Apart from the financial side of the question the argument for the establishment of municipal abattoirs, if supplemented with the power to compel all butchers to slaughter therein, is very great. The comparison between the amount of meat condemned previous to the establishment of the War-time Government controlled slaughterhouses and after is sufficient to indicate the enormous value of the scheme.

All meat would be inspected by skilled persons before leaving the abattoir, and stamped. Blood, offal, condemned meat, etc., would be utilized instead of being wasted as is now often the case. The private slaughterhouses and the nuisances and inconveniences associated with them would disappear. The abattoir should be constructed near a railway siding and, where possible, near a Refuse Destructor. Examination of animals, *ante* and *post-mortem*, could be efficiently accomplished. Cold stores would be provided. Compensation for condemned carcases would be necessary. Charges would be made for each animal slaughtered. A standard of inspection should be laid down so that complete uniformity would exist, not only in inspection, but in conditions governing seizure.

It should be made obligatory for Local Authorities to construct Public Abattoirs within a specified number of years.

Where towns are considered too small, groups of towns should act together, and the Ministry of Health should have power to group such towns and areas.

The Government should provide financial aid to Local Authorities to carry out this scheme. A contribution from the Government of ten million pounds spread over twenty years, *i.e.*, £500,000 per annum, would no doubt see the scheme through, especially when one anticipates that the cost of building will not always be at the high figure obtaining now-a-days. Local contributions to the scheme could be limited so that the amount of loan did not exceed a figure that would necessitate more than a 2d. rate per annum for its repayment and interest.

The great demand to-day is for economy, but public health and sanitation must always be progressive and sure, and a matter of this description cannot be allowed to stand still. One million pounds per annum, half from the taxes and half from the rates, does not seem too large an amount to assist in carrying out an urgent sanitary reform. The institution of the abattoir system is a public necessity, and is now very much overdue, especially when it is recognised that we have an educated public whose demands for sanitary reform are ever increasing.

[*The Necessity for the Provision of Public Abattoirs and the Abolition of Private Slaughterhouses.* TUNBRIDGE, H., *Journal Royal Sanitary Inst.*, 1922, January, pp. 287-288.]

Foot-and-Mouth Measures in Switzerland.

These measures are grouped under three main headings: General slaughter, sanitary measures, and treatment with blood of recovered animals.

Slaughter is a good measure at the beginning of an epizootic, when there are but few centres of infection. It may also be useful at the end of an epizootic, in freeing the country of isolated centres. But when the disease is widespread this measure becomes useless.

Sanitary measures, although well applied in Switzerland, have proved efficacious only in the first centres quarantined. When the centres become numerous all sanitary barriers are powerless to prevent the extension of the disease.

It is rather difficult to determine the value of treatment with the blood of recovered animals. This treatment is

not preventive. It seems capable only of diminishing the gravity of the natural development of the disease.

[MEASURES TAKEN IN SWITZERLAND AGAINST FOOT-AND-MOUTH DISEASE IN RECENT YEARS. L. Panisset. *Rev. Gen. Med. Vet.*, Jan. 15th, 1921, pp. 1-12. (Abs. in *Bul. Inst. Pasteur*, vol. 19, p. 536.)]

Clinical and Case Reports.

The Editor will be glad to receive from members and others contributions to this column of reports of interesting cases

Veterinary Foot-and-Mouth Suspect.

FURTHER PARTICULARS FROM MR. BUCHANAN.

Mr. D. Buchanan (Ministry of Agriculture, Edinburgh) writes as follows:—

In regard to the interesting comments in your issue of April 22nd, concerning the vesicular affection from which I have been suffering, the following particulars may be of interest.

The suspected lesions were essentially vesicles. This was evidenced by distinct fluctuation, accompanied by a temporary whitening or loss of colour of the overlying raised skin on palpation.

Treatment commenced on March 11th, and resolution has only taken place in the forefinger on April 22nd, while the other finger has not quite healed yet. Both the medical officer of health at Kendal and the doctor who first treated the case there agreed with my view that the filtrable virus had gained entrance through the cuticle of the nails, since not the slightest scratch or abrasion was to be seen anywhere on either hand. In this connection it is a curious fact that I had a habit of using the two affected fingers together with my right thumb to extract the diseased tongues from the mouths of the carcases to view the lesions before the carcases were hauled on to the cremation pit. The temperature returned to 98·4 degrees F. after the vesicles had been punctured. The doctor who performed this operation in the first case, and later when the vesicles re-formed, emphasised the fact that they did not resemble any abscess, since they had obviously contained only a watery serum which was quickly masked by the flow of red blood, the vesicle in each case being small and the puncture having been made purposely somewhat deeply.

About March 22nd secondary infection apparently took place, as on the following day the middle finger was considerably swollen and the axillary lymphatics were very painful. Accordingly the middle finger was lanced at the side near the tip for a distance of half an inch under a local anæsthetic, followed in a day or two by the rapid disappearance of lymphatic inflammation and the closing of the surgical incision. The lesions at the base of the nails, however, have persisted since that time, and have been very indolent in spite of treatment with various antiseptics. The latter have included tincture of iodine, with boracic acid dressings, zinc sulphate applied in hot water fomentations, hydrogen peroxide, accompanied by frequent curetting with the knife and the application of silver nitrate caustic by my medical attendant. Finally, a dressing of ichthyol and glycerine 10 per cent. was used, and this was more successful in promoting healing than anything previously tried, although the wounds still made very slow progress and film-like sloughs of tissue were observed from time to time.

Both doctors at Kendal were extremely interested and expressed a desire to be informed of any developments.

I consider that my case is certainly analogous to those witnessed during the present outbreak, where secondary infection with resultant sloughing has occurred among affected pedigree cattle under isolation.

Recurrent Inflammation of Bullock's Sheath.

By W. E. BLAKEWELL, M.R.C.V.S., Towcester.

Subject.—Yearling shorthorn bullock, in good condition; out grazing.

Symptoms.—Owner thought the bullock's sheath was swollen. He could pass urine all right, and it was quite normal in colour and quantity, as far as he had been able to ascertain. It was not passed in small quantities, nor with any appreciable difficulty. The only symptom noticeable was swelling of the sheath. The bullock was all right in every other respect, and was not noticed in pain at any time. I saw the bullock amongst the others. He was just urinating at the time. He had no difficulty about that, and, to me, he seemed to have very little wrong with him. His sheath was not swollen very much either. In fact, if the owner had not told me which bullock it was, I think I should have had some difficulty in finding it out.

Operation.—I put him down in the box. He was quiet while I attended to him, and made no attempt to get up. Evidently it did not hurt him very much. I now found the sheath much swollen internally. The opening was nearly closed. It took me about twenty minutes to clean his sheath out. It was simply packed with a pasty material, dirty yellow in colour, gritty, and with a consistence very much like that of builders' mortar. Bluish scales were mixed with it. These varied in size. Some were about as big as a threepennybit, others bigger, and their shape was irregular. They were like bits of soft slate, or shale, found near coal mines. They formed quite a good proportion of the bulk. It seemed impossible for this beast to urinate, his sheath was so tightly packed with this material. I cleared it all out, then put the nozzle of the pump into the sheath and thoroughly washed the cavity out with a mild antiseptic solution. Then I pushed a handful of lard in, washed the sheath outside, and let the patient get up. Nothing more was done for him. He was having nothing beyond what he got grazing, so I could not very well suggest any alteration of his diet. I noticed the opening of the sheath was corroded and a few dark brown scabs were around it. These were flat and more or less circular, resembling those of "cow pox."

Course.—Just six weeks afterwards I was called to see this bullock again. I found him in exactly

the same condition as before. I repeated the operation and this time advised the owner to get rid of him. He was in splendid condition. Evidently it had not affected his general health. The long hairs around the opening of the sheath were just as though they had been dipped in tar, and were very sticky and matted together in a dozen pieces. The opening was now bluish in colour, ulcerated, and the scabs were quite black.

Remarks.—What was the cause of the trouble? Evidently some urinary sediment, with subsequent inflammation and ulceration of the sheath, but the nature of the contents were totally different from what I expected to find in such a case. This is my only reason for recording it.

Association Reports.

National Veterinary Medical Association.

Quarterly Meeting of Council.

A quarterly meeting of Council of the N.V.M.A. was held at the Royal College of Veterinary Surgeons, 10 Red Lion Square, London, W.C.1, on Friday, 7th April, 1922, at 4-30 p.m.

The President, Dr. O. Charnock Bradley, occupied the chair, and there were also present:—Major-General Sir L. J. Blenkinsop, Messrs. T. S. Price, G. P. Male, J. W. McIntosh, J. Willett, H. Begg, Professors S. H. Gaiger, J. F. Craig, A. Gofton, G. H. Wooldridge, Mr. J. B. Buxton (*Secretary*), and Mr. G. Thatcher (*Solicitor*).

Minutes.—The minutes of the two previous meetings, viz., October, 1921, and January, 1922, having been printed in the *Veterinary Record*, were taken as read.

The Secretary read apologies for absence from:—Messrs. B. De Vine, W. Woods, G. W. Weir, T. M. Inglis, Professor Hobday, Professor Macqueen, Alex. Munro, W. Scott, W. H. Brooke, A. W. Noel Pillers, R. Jones, R. Hughes, and P. J. Mullane.

Correspondence.

The following letter was received from the Secretary of the American Veterinary Medical Association:—

December 27th, 1921.

Dear Doctor Buxton,—I want to thank you for your kind letter of the 13th with reference to the membership in the National Veterinary Medical Association of Great Britain and Ireland, and to congratulate you upon the splendid work you have accomplished.

I also want to thank you for your kind invitation to any members of the American Veterinary Medical Association to attend the National Association of Great Britain and Ireland meeting at Bath on August 1st to 4th. I shall send a notice to this effect to the Journal of the American Veterinary Medical Association.

I wish to reciprocate your kind invitation, and the American Veterinary Medical Association will be pleased to have any members of the National Association of Great Britain and Ireland attend the meeting of the American Association that will be held in St. Louis, Mo., August 28th to September 1st inclusive, 1922.

A two-days' clinic is planned that will be in charge of some of the leading surgical practitioners in this country.

I am, with best wishes for a happy and prosperous New Year.—Yours sincerely, (signed) N. S. Mayo.

The Secretary read the following letter from Professor Gofton:—

Margaret Villa,
Liberton,
Edinburgh,
March 23rd, 1922.

Dear Buxton,—I duly received your letter of 13th January written on the instructions of the Council, and I have since seen the report of meeting of Council held on January 6th. I am quite satisfied now that the matter has been definitely cleared up, and I earnestly trust that similar circumstances will not arise again. I should be glad, therefore, if you would intimate to the Council at its next meeting that I have pleasure in withdrawing my resignation.

I enclose cheque for £2 2s. 0d., in payment of current year's subscription, which please acknowledge.—Yours sincerely, (signed) A. Gofton.

The Secretary read the following letter from Mr. J. S. Lloyd:—

Sanitary Authority,
Town Hall, Sheffield,
April 4th, 1922.

Dear Mr. Buxton,—I am in receipt of your letter of the 3rd inst., for which I thank you. I shall be glad if you will please remove my name from all the committees of the N.V.M.A. to which I have been appointed a member and elect someone who will be able to carry out the duties and attend the meetings, as owing to my ill-health I do not feel I shall be in a position to do so in the future. With kind regards.—Yours sincerely, (signed) p.p. J. S. Lloyd (P.S.W.), Chief Veterinary Inspector.

J. B. Buxton, Esq., F.R.C.V.S., 12 Buckingham Palace Road, London, S.W.1.

The Secretary had written Mr. Lloyd asking him if it was really his intention to resign or simply a feeling of weariness resulting from his lengthy indisposition. He replied that he wished to resign, as it was impossible for him to attend the meetings.

It was agreed that Mr. Lloyd's resignation from the Committees be accepted with regret.

The Secretary read the following letter from Mr. De Vine:—

March 10th, 1922.

Dear Buxton,—Owing to my having to attend a special meeting of my committee here on Monday afternoon at very short notice, I am sorry I was unable to get up to the committee meeting on Monday.

I am very much surprised to hear that the Birmingham printers' tender was the lowest. I quite expected from what you had previously said that some London firm would get the printing, and for that reason I was expecting that I would be relieved of the advertising department by the 25th of this month.

As a Birmingham firm are to continue the printing, I hope the Council will not expect me to continue with the Advertising Department, as I am sorry I cannot do so. I am of the opinion that it would be better to have the whole of the preparation of the paper, including advertisements, worked from your London office.

I really took on the Advertising Department to help to start the paper, but I have always been looking forward to the time when the whole thing would be taken to London. I should, therefore, be glad if you would bring this, my resignation as assistant secretary, before the Council as soon as possible. I should like it, in fact, if you could arrange to take over the advertising branch at the end of this month.

Last year the Council were good enough at the annual meeting to vote a sum of £15 for Mr. Gostling, who does

the clerical work in this office connected with the *Record*. I would like to suggest to the Council that they would consider voting at least a similar sum for the work done during the past year.

I shall be glad if you will arrange for someone to come here and take over the advertisements of the *Record*, as they are rather complicated in many ways, as each particular advertisement has a little history of its own, and it will be necessary for someone who is to continue with them to have a clear view of all the conditions attached. As we may possibly have many inquiries about advertisements after you have taken over, it will be necessary for us to keep our books here for some little time afterwards. We could, of course, let you have the books when the whole of the matters are cleared up.

I should like to have the books audited up to the 25th March, and perhaps you will arrange for this to be done. I should not like it to go beyond the 25th, as going over the end of a quarter creates a certain amount of difficulties. —Yours faithfully, (signed) BRENNAN DE VINE.

The PRESIDENT: In the case of the letter from Mr. De Vine. As you have been informed, arrangements have been made which doubtless will be quite satisfactory for carrying out the advertising work in the London office. In accepting the resignation of Mr. De Vine as Assistant Secretary, I should like from the chair to move a very cordial vote of thanks for the work, which was not only valuable, but I might almost say vital, when we took over the *Record*. I do not know if it can be realised by the members of the Council generally exactly how much Mr. De Vine has done and how indebted the Association is to him. I want to move a very warm vote of thanks.

The SECRETARY: I should like as briefly as possible to second the vote of thanks. Probably few realise the amount of work which is entailed by these honorary posts, and it is only as a result of Mr. De Vine's untiring efforts that the advertisements have been obtained.

The SECRETARY read the following letter from Mr. Stableforth, Secretary of the Provisional Committee :—

March 25th, 1922.

Dear Mr. Buxton,—At the last committee meeting I read correspondence relative to the popular lecture from Sir Stewart Stockman, who is unable to give the lecture himself owing to certain difficulties of which you are aware.

The provisional committee after due consideration are of the unanimous opinion that the lecture should be dropped for this year's Conference.

It is realised that it was the decision of the Council that a popular lecture be given, and the committee would be only too pleased to carry that decision into effect if possible, but the following difficulties have also arisen :—

(1) Owing to certain *unbreakable* rules of the authorities controlling the historic Guildhall and Pump Room, no cinematograph is allowed to be used in either of these rooms, although a lantern is allowed in a room adjoining.

We should be obliged to especially engage the Cinema.

(2) It is the opinion of the West Country members that a lecture on "Poultry Diseases" will neither be popular nor draw the public, especially in the Bath area.

—Yours faithfully, (Signed) W. P. STABLEFORTH.

The PRESIDENT: This is eminently satisfactory, because it shows that the business for the Annual Meeting is well forward. We have before us a recommendation that the popular lecture be deleted this year owing to circumstances which we did not foresee.

Major SIMPSON: I move that the previous resolution be rescinded.

Mr. MALE seconded that for this year the popular lecture is not given.

Carried unanimously.

Major SIMPSON: I take it that Sir Stewart Stockman will be informed why the lecture will not be given.

The PRESIDENT said Sir Stewart Stockman would be informed.

FINANCE AND ADVISORY COMMITTEE.

Mr. MCINTOSH read the following report of a meeting of the Finance and Advisory Committee, held on the 5th April, and moved its reception and adoption :—

A meeting of the Finance and Advisory Committee was held at 10 Red Lion Square, W.C.1, on Wednesday, April 5th, 1922. Mr. H. J. Dawes occupied the chair, and the following members were present :—Dr. O. C. Bradley, Col. J. W. Brittlebank, Professor G. H. Wooldridge, Messrs. J. W. McIntosh, T. S. Price, G. P. Male, F. W. Garnett, J. Clarkson, and S. H. Slocock.

Apologies for absence were received from Messrs. Brennan De Vine and J. S. Lloyd.

Correspondence.—A letter was received from the Secretary of the Victoria Veterinary Benevolent Fund, reminding the committee that subscriptions for the years 1920, 1921 had not yet been received. It was resolved that a sum of £10 10s. 0d. be sent in respect of the two years.

A letter containing several suggestions by Capt. Beale was considered. It was decided to recommend that space be provided in the *Veterinary Record* for the announcement of the movements of overseas veterinary surgeons who are on leave in this country.

A recommendation from Mr. De Vine that a further honorarium of £15 be granted to his clerk, Mr. Gostling, in recognition of his services in connection with advertisements in respect of the past year, was considered, and it was agreed that the sum of £15 be given to Mr. Gostling.

Applications were received from two ex-officers R.A.V.C. for help from the Association in obtaining employment and in supporting an application to the Ministry of Pensions. It was resolved that in neither case could the request be acceded to.

Printing.—The report of the sub-committee appointed to consider quotations for future printing of the *Veterinary Record* was approved, and it was resolved that the quotation from Messrs. Hudson and Son of £27 17s. 6d. less 5 per cent. monthly be accepted.

Secretary's Report.—The Hon. General Secretary reported that 97 new members had been admitted during the first quarter. The membership at the end of last year was 1,258, and of these twelve had since died. The present membership, therefore, was 1,343. The circulation of the *Veterinary Record* had increased from 1,560 to 1,620. At the time of the last annual general meeting these figures were :—Members 1,115 ; and the circulation of the journal 1,513 copies weekly.

He was sorry to have to report that to date only 680 members had paid their subscriptions.

(*To be continued*).

Southern Counties Veterinary Society.

ANNUAL MEETING.

Continued.

The HON. SECRETARY pointed out with reference to the cost of the joint meetings that they would see the agenda for that afternoon provided for a discussion of the desirability of continuing them.

The PRESIDENT thought that question had already been decided for them, as the Royal Counties Society had resolved to discontinue the arrangement, and that being so he was afraid they had no alternative but to fall into line. He had had an opportunity of looking over the accounts that afternoon, and there

appeared to be a considerable sum outstanding, which was, he thought, rather unfortunate. Altogether he gathered from the Hon. Treasurer that there was over £20 owing in arrears, some members being as much as five and others four years in arrears. He felt it was only necessary to draw the attention of these members to the fact.

Mr. WHITLEY BAKER replied that their attention was called to the matter every year, adding that what disgusted him was that there should be so many members of his own profession who would not support their Society to the extent of a paltry half guinea a year.

Mr. PACK thought a great many of these arrears were the result of the unbusiness-like and rather lax methods of veterinary surgeons generally. The only way to keep them up to the mark was never to let them get behind the one half guinea.

The PRESIDENT suggested that they send a special letter to those who were in arrears, calling attention to the financial position of the Society, and the needs for a prompt payment of outstanding subscriptions.

Mr. ANGWIN: These notes are sent out regularly, as you have heard from Mr. Baker; and if they had any love for the Society they would pay up.

Mr. WILD: Still, no harm would be done in giving them another reminder.

The PRESIDENT asked if it was the wish of the meeting that a letter should be sent out as suggested, and this was agreed to.

Mr. PACK asked for information with regard to the National Veterinary Association, adding that there was an impression in the minds of many that membership of the Southern Counties carried with it membership of the National.

Professor WOOLDRIDGE remarked that he was very pleased this question had been raised because there was undoubtedly a misunderstanding in the minds of a good many on this point. The arrangement was that if societies affiliated to the National paid the affiliation fee of a shilling per head for their active members, the subscription to the National from those members was reduced from 10/6 to 7/6. There never had been any suggestion that affiliation of one's Society made the individual members *ipso facto* members of the National, but those who wished to join the National got the advantage of the affiliation in paying a reduced fee to the latter. He could not understand how this misunderstanding had arisen, but arisen it had.

Mr. WHITLEY BAKER: Do we get any advantages from affiliation?

Professor WOOLDRIDGE: Undoubtedly, because your subscription to the National is reduced. You will remember also I did all in my power to get a scheme passed which, if it had been carried through, would not have ended so disastrously as the one you have been trying. My idea was to make our meetings meetings of the Southern Branch of the National, in which case you would have had all the advantage of the joint meetings, and the expense of those meetings would have been defrayed by the National. These joint meetings are held in Scotland and Ireland, and the hire of the room and other incidental expenses are paid by the local Secretary, who sends his bill into me, when I give him a cheque for the total amount. This Society, however, would not listen to me.

A formal resolution that the accounts still outstanding be paid was agreed to on the proposition of the President, seconded by Mr. Wild, after which Mr. McIntosh asked for the views of the meeting as to the continuance of the joint meetings and the best means of furthering the Society's usefulness in the future.

Professor WOOLDRIDGE, as one who was not imbued with the idea in the first instance, thought it would be a good plan to discontinue them, but suggested that the two parts of the paragraph on the agenda should be taken separately.

Mr. WILD proposed that the joint meetings be discontinued, and this was seconded by Mr. PACK, who observed that there did not seem to be any other alternative if the other two Societies were retiring from the arrangement, and carried.

The PRESIDENT: Now, gentlemen, what about the future? This matter was discussed at our last meeting, you will remember, and if you have read the report of that meeting in the *Record*, you will see I called attention to the fact that it was really hopeless to think of going on unless we were better supported. I quite realise the difficulty many country practitioners have in getting away, but I cannot help thinking that many of them might make an effort to do so more frequently if they really had the interests of the Society at heart. It is very discouraging to those of us who try to carry on to find so little interest taken in the work by the great body of its members. I should be very sorry to see the Society close down, but unless there is going to be some marked improvement in the attendances, it really seems hopeless to go on.

Mr. ANGWIN remarked that he quite agreed with the President that it was most discouraging to go on as they had been going lately. One of their members to whom he had mentioned this matter, however, had replied: "Why don't you hold your meetings in the country, where you will get people to come?" and this same point was raised by Mr. Tutt in one of the letters he had read that afternoon. His letter rather suggested that possibly the poor attendances was due to the fact of their always meeting in London.

Mr. WILD: The meetings were certainly better attended when we held them on the south coast, I believe.

Mr. PACK, speaking from an experience dating back over thirty years, remarked that he could remember some very good meetings at Southampton and again at Basingstoke and Brighton. He also remembered a capital meeting at Bournemouth. The difficulty, however, was that the members to the west could not get to places like Brighton. Mr. Baker and himself had been stranded at Portsmouth for the night before now, when returning from meetings at Brighton. But if the holding of meetings in the country would get a better attendance, he certainly thought they might try them again, and see if they could not arrange

for an operation, because there was nothing like an operation for drawing the country practitioners.

Mr. WHITLEY BAKER did not know that he had anything much to add to what the previous speakers had said on this matter. He was quite at one as to the drawing power of an operation. If they could get an operation, they would get the attendance. At the same time there was no disguising the fact that there was not the *esprit de corps* in their profession there ought to be.

Mr. WILD also spoke in a similar strain.

Professor WOOLDRIDGE suggested that a letter should be sent round asking the opinion of the members as to the desirability of carrying on or not. He did not think they should take a definite decision adverse to going on with so small an attendance as they had that afternoon. They could also express the hope that the members would support them better, and possibly by this means they would be able to get a little more enthusiasm.

Mr. WHITLEY BAKER: I do not believe in admitting that we are defeated, and I gladly support Professor Wooldridge's suggestion that a circular letter be sent round to all the members, but instead of asking their opinion as to carrying on, I would inform them that it had been decided to carry on and hope they will support us.

Mr. PACK agreed. "It is not we older members," he continued, "who derive the advantage from such a Society, but the younger ones, and they ought to support us and see the advantage of doing so."

The PRESIDENT: But unfortunately they don't.

Professor WOOLDRIDGE: I don't want to acknowledge defeat either, and I would prefer Mr. Baker's proposal to my own. I think very often if you show a fighting spirit you get better results.

Mr. ANGWIN: Do you think it would be any good if your Secretary, whoever he might be, was to write to the members and tell them the next meeting will be held at Brighton, or some other place on the coast, and possibly Professor Wooldridge would do his best to get a demonstration for us.

The PRESIDENT: I think the feeling of this meeting is in favour of carrying on, and that an attempt be made to get a specially attractive programme for our next meeting. The only question is where that meeting should be held.

Mr. WILD subsequently proposed that the meeting be held in Brighton about the end of June, and this was seconded by Mr. PACK and carried.

Nomination of new members was next invited, and on the proposition of the PRESIDENT, seconded by Mr. ANGWIN, it was decided to elect Mr. W. S. King, of Burdett Road, Bow, a member, subject to his willingness to accept.

The election of officers next engaged attention, and the PRESIDENT proposed Mr. A. C. Wild as his successor in the chair for the coming year. He thought it only right this honour should go round, and no one could have taken a greater interest in their work or had been a more regular attendant lately than Mr. Wild. (Applause.)

Mr. PACK seconded with the greatest pleasure. Mr. Wild, he felt sure, would fill the office with credit.

Mr. ANGWIN had great pleasure in supporting, and Professor WOOLDRIDGE, in giving the suggestion his support, remarked that there was no one in the profession for whom he had a greater regard than Mr. Wild. He personally owed him a great deal, and if he could do anything during his year of office to make things go, he should be only too pleased. (Applause.)

The PRESIDENT: Mr. Wild, your election is unanimous, and I am sure we all wish you a pleasant and successful year.

Mr. WILD: After all the kind remarks of you gentlemen, I feel I cannot very well refuse to take on, and I will promise to do my best. (Applause.)

Professor WOOLDRIDGE proposed the re-election of Mr. Whitley Baker as hon. treasurer. As they had heard "his tail was still up" (laughter), and they could not do better than have a man in that condition.

Mr. MCINTOSH seconded and Mr. ANGWIN supported the proposition, which was at once agreed to with acclamation.

Mr. WHITLEY BAKER: Thank you, gentlemen. I must say that in the existing circumstances I feel so "cussed" that I would not on any account refuse to accept the office. (Applause.) Continuing, Mr. Baker said he would also like to propose the re-election of Mr. Angwin as Hon. Secretary, and he asked the President not to give the latter an opportunity of declining, but to put it at once. There was, too, the old proverb about never swapping horses, etc. (Laughter.)

Professor WOOLDRIDGE: Before he has an opportunity of saying "no," I second that.

Carried unanimously.

Mr. G. W. Bloxsome, of Hove, was unanimously re-elected Vice-President, and on the suggestion of Mr. ANGWIN, seconded by Professor WOOLDRIDGE, and supported by the new President (Mr. WILD), it was decided to ask Mr. MCINTOSH to accept the office of Vice-President for the coming year.

Messrs. C. Pack and F. Samson were re-appointed Auditors, and the Council or Executive Committee were chosen as follows: Messrs. Buxton, Carter, Howard, Pack, Samson, Slocock, and Tutt, senr.

The HON. SECRETARY reminded the meeting that the question of appointing a delegate to the Sanitary Institute Congress at Bournemouth had been postponed from the last meeting, and on the suggestion of Mr. BAKER, it was unanimously decided to invite Major J. Stewart Wood, of Parkstone, to represent the Society.

Mr. BAKER initiated what proved to be an interesting discussion as to the attitude to be taken by members of the profession towards the Royal Society for the Prevention of Cruelty to Animals.

The new President (Mr. WILD) remarked that they could not separate without thanking their retiring President for his services during the past year. He knew Mr. MCINTOSH had done everythiug he could for the Society and its success, and although he had

had rather a rough journey, that did not lessen their obligations to him. He also came forward when he was badly wanted, and he was sure they all appreciated the time and trouble he had devoted to the Society. (Applause.)

Mr. ANGWIN seconded this, and it was at once carried by acclamation.

JAS. ANGWIN, *Hon. Secretary.*

Notes and News.

The Editor will be glad to receive items of professional interest for these columns.

R.A.V.C. Annual Dinner.

The annual dinner of the officers of the Royal Army Veterinary Corps will be held at the Hotel Cecil on Friday, the 16th June, 1922, at 8 p.m. Officers of the Militia, Territorial Army and Temporary Officers who served in the war are eligible to attend. Subscription:—Subscribers, £1; non-subscribers, £1 15s. 0d. Would gentlemen desirous of attending kindly inform the Hon. Secretary R.A.V.C. Dinner, Imperial House, Tothill Street, S.W.1?

The Practitioner's Holiday.

Holidays have always been a difficulty with the practitioner, and the more so the more personal his relation with his patients. The biographer of Dr. John Fothergill records that it was unusual in his time for physicians to take long holidays, and that some who did found their practice much diminished on their return. It is hardly to be supposed that nowadays the medical officer of health, the school or the asylum medical officer need find any difficulty in obtaining three or four weeks of change and mental recreation during the working year. How necessary such a change is hardly needs emphasis. Osler drew a picture of the family physician so absorbed in work that leisure became unknown. There is danger, he added, in this treadmill life lest the practitioner lose more than health and time and rest—his intellectual independence. Fothergill's sister wrote of the "perpetual clamour of people wanting him," so that every night he was exhausted to the last grain of ability of body and mind. Hard and quasi-continuous work in itself, it is true, may not shorten the life of the body as a whole any more than it shortens the life of its members, the heart or the kidney, but mental relaxation is particularly necessary for a life in which the powers of observation must continually be upon the alert. Thus, it is the practitioner whose single-handedness makes his work engrossing who feels it the most difficult to forsake it, whereas, with this habit of mind, he is precisely the individual who would find few things on a holiday which are not pleasant to do. But the practitioner may have neither the desire nor the means—for the substitute is increasingly scarce and costly—to put his work in the hands of a properly-qualified locum-tenens, and he has lost the liberty of 25 years ago to employ unqualified assistance. Commenting at that time upon the apparent hardship inflicted by the General Medical Council in forbidding the employment of such holiday assistance, we took occasion to remark that the effect of its abolition should be to make members of the medical profession practising in the same place more neighbourly, more helpful to each other, and more trustful. And this is what has been happening.

In the later period of the war when local medical war committees were selecting civil practitioners to the uttermost limit of safety at home, the central committee arranged a scheme for substitute medical work. And it is on the basis of this scheme, which on the whole worked out well, that the London Panel Committee has now drawn up a scheme for mutual assistance during the holiday season as an alternative to the employment of locum-tenentes. While the scheme is voluntary, any practitioner who joins it undertakes not to retire without giving three months' notice. Its operation is limited to the months from May to October in each year, and to groups of practitioners residing within reasonable distance of one another, no group to consist of less than five members, who shall appoint one of their number to act as secretary. Each member of a group has to undertake to act for any other member in providing treatment for his patients in his absence; to arrange by mutual agreement the dates of his own holiday, which shall not exceed four weeks; to fill in the forms for panel patients supplied by the committee, and to return them to the committee as soon as possible after expiration of the holiday. Finally, each participant undertakes to pay direct to the practitioner who has been on holiday all fees received in respect of private patients attended on his behalf. The scheme is confined to holidays only, and does not include midwifery, poor-law, vaccination, or insurance examinations. It involves the payment in advance by each practitioner to the secretary of the panel committee of five guineas per week for the first fortnight, and six guineas for any further period of holiday; the fees are then to be pooled and, after deduction of expenses, to be distributed among the members of the group on the following plan: The total number of patients attended by the various members of the group having been ascertained by adding together the number of forms returned to the panel committee, the sum remaining in the pool shall be divided into units representing one unit per patient, and each member of the group shall be paid a sum in direct proportion to the number of forms submitted by him to the committee.

We have set out in detail this scheme for mutual assistance, for it is on practicability in detail that any such scheme will stand or fall. Different arrangements may be required for different parts of the country—urban, rural, residential, industrial—but everywhere it is on the neighbourliness, helpfulness, and trustfulness of individual members of the medical profession that the scheme essentially depends. The scheme may still seem something of an experiment; we believe it is an experiment long overdue, and one which might have been tried with a large measure of success many years ago. It may still, in part, be true, as Samuel Johnson said, that a physician in a great city is the plaything of fortune, his degree of reputation for the most part casual; "they that employ him know not his excellence; they that reject him know not his deficiencies." To what extent professional jealousy has accentuated this difficulty in the past will be a matter of discussion, but it is clear that the basis of co-operative holiday-making will have to be unselfishness. The London Panel Committee's scheme will ensure for the practitioner on holiday not merely a suspension of the strain of professional life, but a period unimpaired by anxiety in regard to his livelihood.—*The Lancet*, May 6th, 1922.

At a meeting of the Executive Committee of the Banffshire County Council for the Administration of Diseases of Animals Acts in connection with the inspector's reports on outbreaks of anthrax, Mr. Scott, Gauldwells, said that it was well known that bones were a frequent source of infection, and he thought they should approach the Board of Agriculture to see if they could get them to see that bones, especially foreign bones, were sterilised before being manufactured into manure.

This was agreed to.

In regard to an application by the veterinary inspectors for increased fees, the Clerk stated that he had obtained information as to the fees in neighbouring counties, and it was agreed to circulate a comparative statement amongst the members of the committee and invite the veterinary inspectors to meet the committee and endeavour to adjust a scale of fees.

It was stated that the counties' expenses in connection with the recent anthrax regulations were £36 16s. 4d.

Obituary.

BALFOUR, G. W., Craigie, Perth. Graduated N. Edinburgh, 26th May, 1893. Died 1921.

BRADBURY, H. J. A., Weston-super-Mare. Graduated Edinburgh, 17th July, 1897. Died 23rd April, 1922.

NICHOLS, E. R., Dublin. Graduated London, 21st December, 1906. Died 22nd April, 1922. Aged 37.

WRIGHT, W. R., Sidmouth. Graduated N. Edinburgh, May 30th, 1889. Died 7th May, 1922. Aged 56.

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Humane Slaughtering.

Sir,—With reference to the letter dated March 23rd, from the Secretary, Royal Society for the Prevention of Cruelty to Animals, in which he writes: "I trust that all who are working to save needless suffering to animals by means of the said clause will not be deterred by the present inevitable uncertainty," I am quite sure that there are very few veterinary surgeons who would not do their best to save needless suffering to animals. But the question of humane slaughtering is a very large and difficult subject to tackle, embracing, for example, pheasant shooting, where thousands of birds every year are mortally wounded and many hours, possibly days, elapse before their sufferings are put an end to.—Yours truly, GRAHAM REES-MOGG, F.R.C.V.S.

Army Veterinary Service.

LONDON GAZETTE.—WAR OFFICE.—REGULAR FORCES.

May 3rd.—Temp. Capt. J. Millward relinquishes his commission on account of ill-health contracted on active service (March 31st), and retains rank of Captain.

TERRITORIAL ARMY.

May 2nd.—Captain A. W. Reid, T.D., F.R.C.V.S., relinquishes his commission on account of ill-health contracted on active service (May 3rd), and retains rank of Captain with permission to wear the prescribed uniform.

Re the following A.V.S. notice, "Territorial Army; April 7th, Major J. Peddie (retd.)." Major J. Peddie, Moredun, Auchterhouse, Forfarshire, N.B., writes:—

"If the reference in your issue of 22nd inst. under Army Veterinary Service is intended to apply to me, it is not understood. I have been informed by Scottish Command that my name appeared in the London Gazette on April 7th as having been awarded the Territorial Decoration. I merely wish to draw your attention to this matter as it is probable the entry you refer to in the London Gazette may have been inaccurately quoted. The date of my actual discharge from the army was 22nd September, 1918, on account of ill-health contracted in the service, which, with the intimation that I was permitted to retain my rank and wear the prescribed uniform, was duly gazetted about that time."

Diseases of Animals Acts, 1894 to 1914. Summary of Returns.

Period.	Rabies. Cases Confirmed. Dogs.	Rabies. Cases Confirmed. Other Animals.	Anthrax. Outbreaks confirmed.	Anthrax. Animals attacked.	Foot-and-Mouth Disease. Outbreaks confirmed.	Foot-and-Mouth Disease. Animals slaughtered as diseased or exposed to infection.	Glanders (including Farcy).* Outbreaks reported by the Local Authorities.	Glanders (including Farcy).* Animals attacked.	Parasitic Mange. Outbreaks reported by the Local Authorities.	Parasitic Mange. Animals attacked.	Sheep Scab. Outbreaks reported by the Local Authorities.	Swine Fever. Outbreaks confirmed.	Swine Fever. Swine slaughtered as diseased or exposed to infection
GT. BRITAIN.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Week ended 29th April, 1922 ...	...	...	16	17	4	108	...	...	15	17	8	28	12
Corresponding Week in 1921	...	...	8	10	...	16	...	...	43	49	5	29	3
Corresponding Week in 1920	...	...	12	13	1	177	...	...	79	105	6	40	9
Corresponding Week in 1919	5	...	3	4	...	...	...	...	85	135	5	48	19
Total for 17 weeks, 1922 ...	...	...	247	251	1083	52303	...	...	606	902	394	393	143
Corresponding period in 1921	18	1	214	253	27	2657	3	6	1207	1894	351	398	114
Corresponding period in 1920	4	...	166	199	42	2304	9	16	2125	2719	267	740	253
Corresponding period in 1919	55	2	64	88	19	1033	5	28	2576	5079	207	422	149

NOTE.—The figures for the current year are approximate only. *Excluding outbreaks in Army horses.

IRELAND.									Outbreaks				
Week ended 29th April, 1922			...	...	...	...	...	...	...	3	5	24	
Corresponding Week in	1921 ...		...	...	...	...	...	...	2	2	1	2	
	1920 ...		...	..	...	...	..	...	...	3	1	2	
	1919 ...		...	...	...	...	...	...	2	4	1	9	
Total for 17 weeks, 1922	...	...	...	...	...	...	...	...	52	93	91	545	
Corresponding period in	1921 ...		...	...	2	41	...	...	37	129	22	162	
	1920 ...		1	1	...	...	1	3	56	139	4	15	
	1919 ...		...	...	...	...	1	1	56	139	16	57	

NOTE.—The figures for the current year are approximate only.